

# Enzyme-Cascade Analysis of the Rio Tinto Subsurface Environment: A biosensor development experiment

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The Portable Test System (PTS), designed & developed by Charles Rivers Laboratories, Inc. (Charleston, SC) is a portable instrument that was designed to perform analysis of enzymatic assays related to rapid assessment of microbial contamination (Wainwright, 2003). The enzymatic cascade of Limulus Amebocyte Lysate (LAL) is known to be one of the most sensitive techniques available for microbial detection, enabling the PTS to be evaluated as a potential life detection instrument for *in situ* Astrobiology missions. In the summer of 2003 the system was tested as a part of the Mars Astrobiology Research and Technology Experiment (MARTE) ground truth science campaign in the Rio Tinto Analogue environment near Nerva, Spain. The preliminary results show that the PTS analysis correlates well with the contamination control tests and the more traditional lab-based biological assays performed during the MARTE field mission.

Further work will be conducted on this research during a second field campaign in 2004 and a technology demonstration of a prototype instrument that includes autonomous sample preparation will occur in 2005.

## References:

Norman R. Wainwright, A. B., Foster Jordan, Kennda Lynch, Jud Hedgecock (2003). Miniaturized Instrument for Planetary Protection and Life Detection. 33 International Conference on Environmental Systems, Vancouver, Canada, SAE International.

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